

## OPEN LETTERS.

### CAN RESEARCH WORK BE ACCOMPLISHED IN AMERICAN LABORATORIES?

*To the Editors of the Botanical Gazette:*— It has long been the custom of American botanists to make comparisons of the facilities for research afforded by our own laboratories and those of Europe, to the great disparagement of the former. In view of our rapid development in methods of elementary teaching, and the yearly establishment of a number of new chairs of botany, it may be well to inquire at this time into the particulars upon which our alleged inferiority is based, that we may remove the chief faults if inherent in our system of organization, or grow out of them as rapidly as possible.

The essential factors for original work are a group of living or prepared plants, a laboratory, the literature of the subject to which attention is directed, and a moderate amount of cerebral matter in possession of an enthusiastic determined person with thorough training and persistent botanical tendencies.

So far as plants are concerned, the American botanist has at his very door hundreds and thousands of species which furnish ample material for the solution of some of the more important problems, particularly those to be solved experimentally, a fact needing no discussion.

The chief dissatisfaction with our laboratory facilities arises from a narrow view of the fields open to research. No laboratory in the world is fitted for research in even a majority of the phases of the subject, and it is quite as easy to fix upon some problem which may not be worked out in a given laboratory, as it is to select those for which it is especially effective. This is especially true so far as apparatus is concerned.

It has come to be recognized in the laboratories in which research is most actively prosecuted, that costly and complicated pieces of fixed apparatus are by no means a requisite for the performance of valuable work, but that the proper appliances in each instance should be extemporized from a common stock of glass, wood, and hardware. In order to place a definite statement on record, the writer insists that even the laboratory with a yearly expense account of "thirty seven dollars" is not entirely debarred from research.

Perhaps the greatest difficulty which confronts the American worker is the lack of reference literature. There are, however, several extensive libraries in the country which are readily accessible, and with the exercise of



some patience the investigator may possess himself of the information concerning work previously accomplished upon his subject, in ample time for the publication of his results. In many instances he may own the literature at a very slight cost.

Most serious of all, however, are the subjective difficulties of the director of the laboratory, who to the above category, adds that of lack of time, etc., and constantly calls attention to the fact that our European colleagues do so little actual teaching and executive work that they are able to accomplish a large amount of investigation; a statement by no means confirmed by the personal experience of the writer in the more important laboratories of Germany and England. A dozen pages of this journal might be filled with titles of work accomplished with as limited facilities and under as great a stress of other duties as those which confront the American worker, and the writer confidently asserts that any American botanist may accomplish a certain amount of research if he is fully determined upon it, and that, too, without recourse to the "holidays and Sundays" in which a German zoologist completed a recently published work. It appears, therefore, that the greatest hindrances to research work lie, not in our material facilities or organization, but rather in the mental attitude of our would-be (?) investigators. In order to dispel any doubts remaining it might be well for the GAZETTE to publish a second laboratory number, which would also show our progress in that particular during the last decade.

In conclusion it is proper to state that by original work is not meant the collection of a number of random observations, but the acquisition of new facts, which added to those already known will suffice for the formulation of new laws, or the extension, or critical delimitation of existing generalizations

D. T. MACDOUGAL, *University of Minnesota.*